

Discussion Topics

511 Business Models

Previously Agreed to Key Point:

- A basic 511 service should be available to the end user at no more than the cost of a local call.

Business Models Key Findings:

- All business models will require most or all of their funding to come from the public sector.
- Telecommunications charges and costs are highly variable.
- Past Cost and Revenue sharing models have not generated sufficient cash flow for ongoing support of a Traveler Information Service.
- Business Models or Telecommunications solutions that work in one market may not work in others.

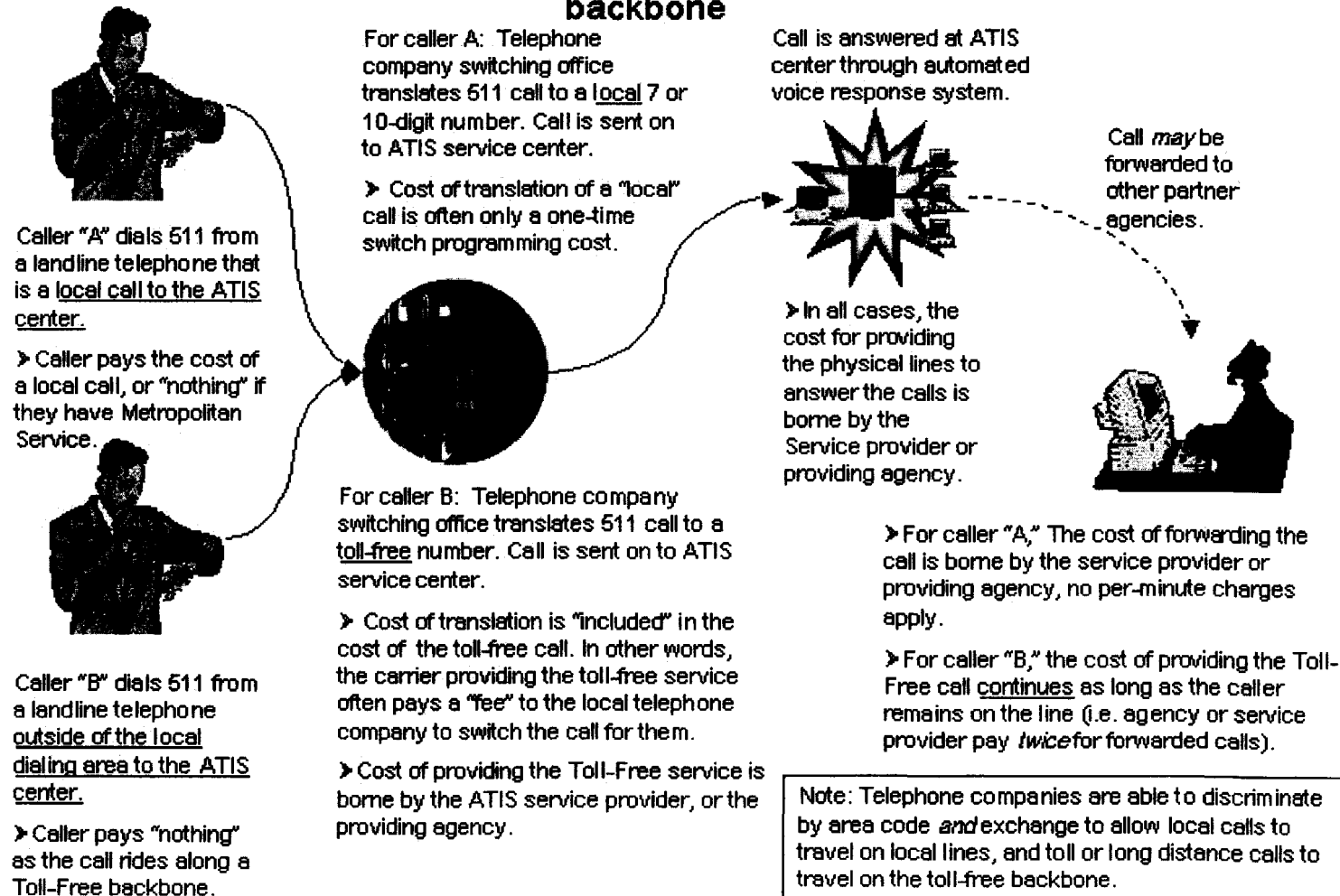
511 ATIS Business Models Report

Version 1.0

August 2001

Appendix C: Tracking a Toll-Free & Local 511 Call

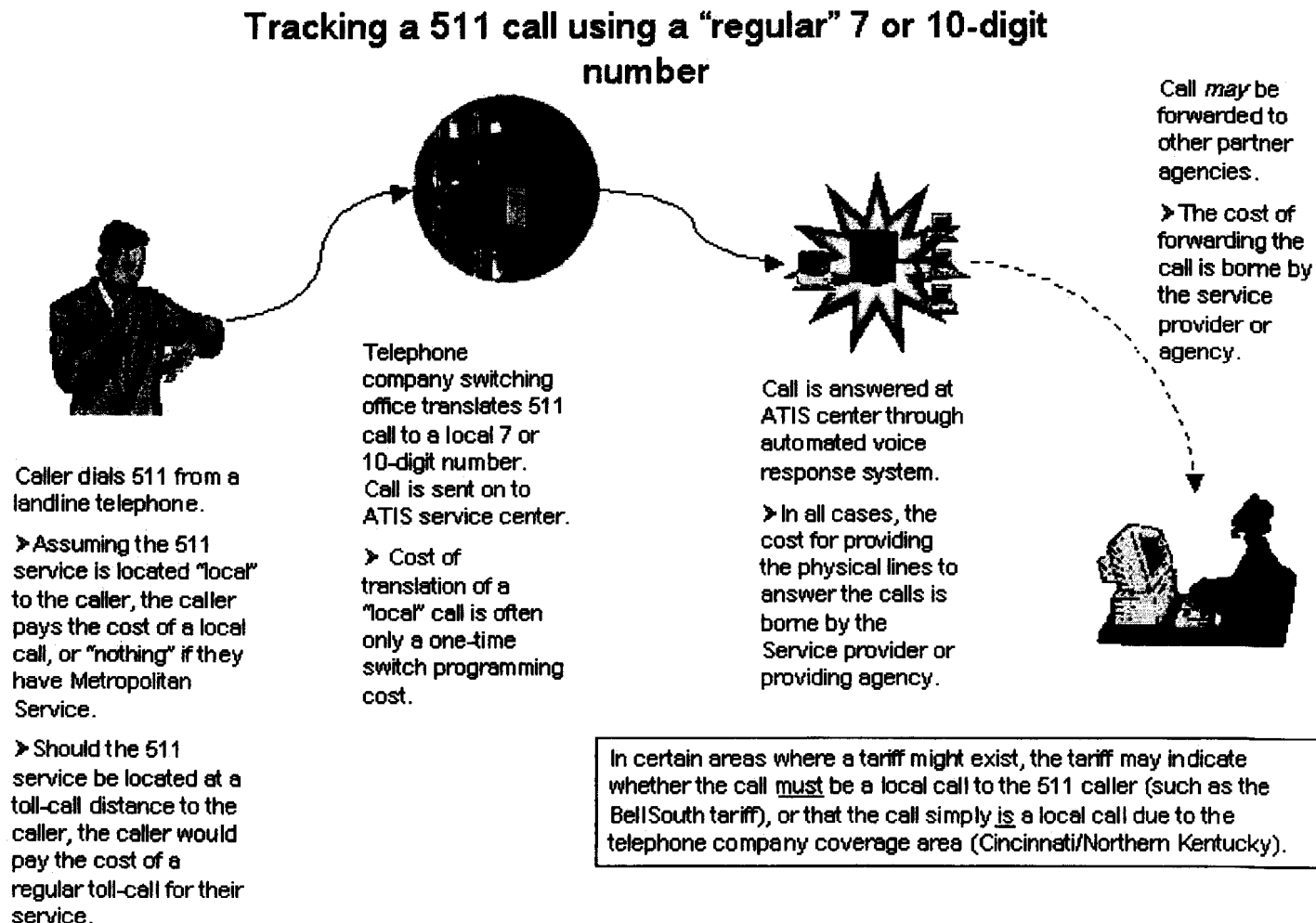
Tracking a 511 call using a Local and Toll-Free backbone



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Appendix A: Tracking a Local 511 Call



- Cooperative agencies, such as transit, airport, ferry providers, etc.
- Private Information Service Providers (ISPs)
- Local Exchange Carriers² (LECs); Long Distance Telephone carriers; Toll-Free telephone carriers; wireless carriers (multiple in each market)
- Consumers – who ultimately decides whether the service they are using provides them information of enough value that they will call back a second time.

II. Organization

With that, this report is organized into four sections:

- Summary of Key Findings
- Potential Business Models
- Cost Elements and Issues
- Other Business Models – How have they fared

The Recommendations and Potential Business Models sections come at the beginning of this document in order to illustrate the potential issues that may apply in implementing a 511 code in a particular area. The elements that comprise the decision process are discussed in detail thereafter.

² **Local exchange carrier (LEC):** A local telephone company that provides ordinary local voice-grade telecommunications service under regulation within a specified service area.

VII. The Business Models and ATIS: How they have fared so far?

When looking at the potential business models, one might ask if these models have been tried before, and how they have fared?

The following is an assessment of how these potential business models have been applied to ATIS to date and a qualitative evaluation of their effectiveness. Recognize that the past is not necessarily a barometer of future conditions, as even current ATIS contracts are undergoing changes in revenue and cost recovery expectations. In many places, it has been difficult for agencies to obtain funds to support ATIS.

Detailed Case Studies for metropolitan areas already using an ATIS model (prior to, and in preparation for 511) are available at <http://www.its.dot.gov/511/511.htm> under the "Lessons Learned" heading.

Subscription Model

Personalized traffic information subscriptions have been tried on a limited basis. These services have yet to achieve much success. The barrier for success appears to be that the information provided has been unable to pass the litmus test of "is it that much better than radio reports that I would pay extra for the service." As an example, Trafficstation, a private company that operated a stand-alone web site that offered general (non-subscribed) users access to information by clicking through maps manually, *and* an up-sell subscriber model (with subsidized operations through some government contracts) that offered subscribers pro-active notification through e-mail, pagers and telephone calls, has recently undergone a financial shakedown leading to a halt in day-to-day operations.

Pay-Per-Call Model

Per use charges for traveler information have limited if any history in the North America. One case of a cellular call-in number in the Seattle area was promising but ran out of funds before it could establish itself. The Boston SmarTraveler service ran a "900" number service in 1991-92, prior to entering into a government contract with MassHighway. Even with a tie-in to local radio and television stations, the "take rate" was notably low.

Advertising and Sponsorship Model

This model has mixed results to date as a revenue generator for ATIS and has yet to prove it can entirely support ATIS as it does radio and broadcast television. No ATIS website in operation generates substantial advertising revenue. Mapquest.com generates significant revenues but draws the most people for its driving directions, not traffic information features. While audio portals such as TellMe and BeVocal, offer case studies that indicate it is possible to generate revenue from advertising, it has not come close yet to generating the funds needed to fully

These costs could include:

- 511 Translation Fees⁵ - assessed to the implementer;
- 511 tariff (per-call or per minute charges which may include translation fees) charged to the implementer;
- Landline costs (to the user) be they local or toll;
- Toll-free charges (to the implementer) if the 511 call rides a toll-free backbone;
- Call-transfer charges (to the implementer) if calls are routed to other agencies;

Though many implementers are concerned about the safety and legal issues surrounding wireless callers⁶, this should not be viewed as a deterrent to encouraging wireless carriers to take part in the 511 program. In fact, it might be seen as an entrée into a new level of service if callers understand that using a cellular phone to access 511 *before* they travel, (either from their home or office), might be “cheaper” and easier for them than using a landline phone. This is especially true for transit riders, who may be seeking information as they walk to their station, or find themselves waiting on the platform in need of updated information.

⁵ A “translation” occurs when a call is placed to one number, and is then routed to another number. In the instance of 511, a user would dial 511 from their telephone, and the call would be ‘translated’ to a 7 or 10-digit local or toll-free number where it will be terminated.

⁶ In June of this year, the New York state assembly passed a bill banning the use of a handheld cellular phone while driving.

responsible for funding this toll-free number with no return of revenue... and that the more successful the service becomes, the more likely the costs will rise as call volumes increase.

This scenario holds true whether a 511 number is used through a toll-free backbone or whether a toll-free number is used directly. The benefit of a 511 number is that it is more memorable and will likely generate higher usage from the outset, especially when it is associated with a national standard service.

Case two: A local call to the user

The cost of the 511 call is borne by the caller, but on a limited basis. This is the scenario that has been in place in previous years in the San Francisco Bay area. The Metropolitan Transportation Commission, in their original deployment of TravInfo, placed audio text nodes in all of the disparate area codes surrounding San Francisco Bay. This meant that callers to TravInfo would only be charged the cost of a local call no matter what area code they were calling from. Since many (if not most) telephone users in the area have "metropolitan dialing service," where local calls are included in their monthly service charges, callers did not see separate charges for these calls and *presumed* them to be free. When the area codes around the Bay split, MTC placed Remote Call Forwarding²⁷ circuits in these new area codes to forward calls to existing area codes' hardware nodes for answering. In this case, MTC was responsible for paying the cost of the forwarded call. This can become costly and complicated as it might take a significant number of nodes and circuits to allow a service to cover a large metropolitan area with everyone having access to a local calling circuit.

There are a number of scenarios where some of these charges might be reduced such as; flat rate connections between the area codes (T-1 circuits, etc.); Foreign Exchange and remote call forwarding circuits at negotiated rates; deploying local numbers where possible and using negotiated rate toll-free numbers only where absolutely necessary to reduce overall costs. Regardless of the choice, the decision must be seamless to the caller.

Using a 511 number creates an assumption of limited or explained cost. One need only look at the 411-information industry to see where charges may differ from market to market, but are *expected* by callers using the service.

Case three: Call paid by the user whether local, toll or long distance

The third case uses a number that is a local 7 or 10 digit number, or assigns such a value to a 511 number. One might assume that a service that is highly valued by the users would be "worth the cost of a call" to a regularly dialed number. In the case of SmarTraveler in Boston, the service has been available as a standard 7 or 10 digit number since it's inception, and thus a toll call to users outside of the local dialing area to Cambridge, MA. This has not decreased the number of users to a known degree. Though roughly 85-90% of the service's 350,000+ calls per month are from wireless phones, 35,000-52,000 calls per month to the service are via landlines. It is

²⁷ **Remote call forwarding:** A service feature that allows calls coming to a remote call-forwarding number to be automatically forwarded to any answering location designated by the call receiver. *Note:* Customers may have a remote-forwarding telephone number in a central switching office without having any other local telephone service in that office.

some action to cancel the subscription. (Magazine publishers and credit card companies often use this method to lure new customers. A customer agrees to a “sample” of the service, but must take direct action informing the provider that you wish to cancel the subscription before being charged for it.)

Pay-Per-Call Model

(This model conflicts with the 511 Policy Committee decision of making a 511 call “no more than the cost of a local call to the user.”)

The per-call model charges the end user for the service on a call-by-call basis. This allows the Service Provider to charge for the specific cost of the call and then bill the end user through their existing phone service. As an example, Verizon in Massachusetts charges \$0.35 each time an end user accesses Directory Assistance.

Advertising and Sponsorship Model

Under this model, advertisers and sponsors would have the ability to place ads throughout the service, covering the costs of the service itself. Services that have the potential to drive sufficient call volume will be able to command a higher price for ad placements. As an example on the Internet, information based services such as Yahoo’s website generate 90% of their revenue from selling ads onto their service. However the prices that these high-traffic web sites were able to command in the late 1990’s have themselves been reduced in the last year.

It needs to be recognized that models based on using non-traditional media – those other than radio, print, and television – often are very difficult to sustain, and have significant costs associated with the sales cycle or may require at least regional to national coverage before reasonable revenue projections can be met. For example: Wal-Mart is approached to purchase advertising on or to sponsor a 511 service. In order for Wal-Mart to “get their monies worth,” the service would need to guarantee a minimum number of callers *and* cover a geographic area larger than one metropolitan area. Otherwise, the advertising department would more than likely spend their money buying radio or television advertising time instead, as many radio stations and some TV stations cover more than one market by virtue of their broadcast power, and carriage on cable and satellite services⁸.

Finally, the service provider would need (and be willing to pay) a sales force to sell these advertisements. True, salespeople are traditionally paid from commissions on sales they make, but there would need to be enough revenue from the advertising to support this staff on a continuing basis.

Loss-Leader or Franchise Model

Under this model, the 511 service provider (ISP) would underwrite all or a portion of delivering the service in exchange for the opportunity to market and up-sell the caller additional services

⁸ WCBS in New York can be heard from Rhode Island to Pennsylvania, while WBZ (1030 AM) in Boston can be heard across 40 states in the evening hours, as can WLW (700 AM) in Cincinnati. Their advertising rates can include these “long reach” capabilities.

two separate abbreviated dialing codes for wireless callers). It was not until the summer of 1995 that both wireless carriers began using a uniform access code (*1), allowing for a more uniform marketing approach. It was at this point that call counts began to rise from an average of 100,000-130,000 per month to 200,000-350,000 calls per month, with the majority of the calls coming from wireless callers.

As **Figure 3: Monthly ARTIMIS Call Counts** indicates, prior to 311/211 service, access to ARTIMIS TATS was about 50% landline and 50% wireless. Roughly 1 million calls are received annually, with over 4 million total since ARTIMIS TATS began operation. Since 311 was introduced, the ratio of calls has moved to 60% landline and 40% cellular. This landline penetration stands in sharp contrast to similar systems in the country. Other systems tend to have free cellular access but do not have a three-digit landline access number, and generally have less than 50% of calls via landline. This even though the wireless providers in Cincinnati offer *free* access to ARTMIS through their networks. Having a uniform, easy to remember dialing code across all platforms may be one reason that more callers are using landline phones.

Cost Elements “Rules of Thumb”

The Cost Issues paper (dated 03/16/01) that was drafted for the 511 Policy Committee Retreat in Tampa Bay, FL at the end of March 2001 cited some general “rules of thumb” for costs encountered in 511 service provision. *Note that some of these costs may include overall costs to operate a traffic management and information facility as well:*

- *Highly automated, limited or no human involvement in operation:* These are the least costly systems to establish and to operate. In Arizona, such a system was created for roughly \$100,000. Maintenance costs are minimal, roughly \$10,000 annually.
- *Automated system, with human recorded information:* These systems are typical of the metropolitan traffic/multi-modal services. To establish such a service could cost \$500,000 to \$1 million. A rule of thumb for system operations would be \$1 million annually, with that figure varying due to many factors including size of region, hours of operations, etc.
- *Human operator-based system:* Typical of transit information services, these systems are the most costly, as many full time staff could be required to provide the service. Many services are paying in the millions to create a trip itinerary planning system that operators can use to more quickly and accurately respond to caller inquiries. An annual operating budget for a large transit information center can exceed \$4 million.
- *Telecommunications costs:* A good rule of thumb is \$0.25 per call, though of course it varies based on implementation, mix of calls, etc. However, the cost of any physical telephone lines is not included in these costs.

Putting this all together, in the instance of a large metropolitan area, this may represent 60,000 to 100,000 calls per day. **In rough numbers this could translate into \$500,000 to \$1 million to install the system; \$1,000,000 annually to operate; and \$6,500,000 annually to cover the communications costs for a 250 business day cycle.** Again this does not include the cost of fabricating or packaging the data, nor does it include the routing and switching costs. These

V. Hybrid Business Models

If innovative models are used to support 511 services, it is likely they will occur in a hybrid fashion. It should be noted that a government subsidy will very likely be needed for the Basic level of 511 service. Unless a change is made to the Policy Committee decision on the price being no more than the cost of a local call to the user, funding is required to sustain day-to-day basic operations until such time as private revenue can grow and *perhaps* be used to defray the public sector funding.

The following are examples of hybrid models, which may be applicable in certain areas to help offset costs to implement a 511 service. In any of these and other examples, telecommunications carriers may hold an unspecified part of the process. If the network operator sees a light at the end of the tunnel (such as billing or consuming more wireless minutes, offering advertising, or up-selling to a premium service), then they may offer to subsidize a portion of the service. This has been successful mostly in markets where the carriers could see the benefit of “partnering” with a government agency.

Example 1 – Subsidized basic 511 services + Sponsorship or Advertising.

Basic content is provided for free to the traveling public with the expense of the service being funded by public agencies in the service area. Short sponsorship messages and advertising may partially defray the subsidy by feeding revenue back into day-to-day operations or system upgrades and maintenance.

Example 2 – Subsidized basic 511 + Per-use premium services (Up-Selling¹¹).

A private 511 service operator is funded by public agencies, underwriting basic service delivery. The service provider offers callers the option of premium services that generate revenue by charging the caller and/or by obtaining a commission for services provided to a caller by another service provider (e.g. reserving a cab). Revenue from the premium services may be shared between the service provider and the public agencies on a negotiated basis, to further defray public agency subsidy of the basic services.

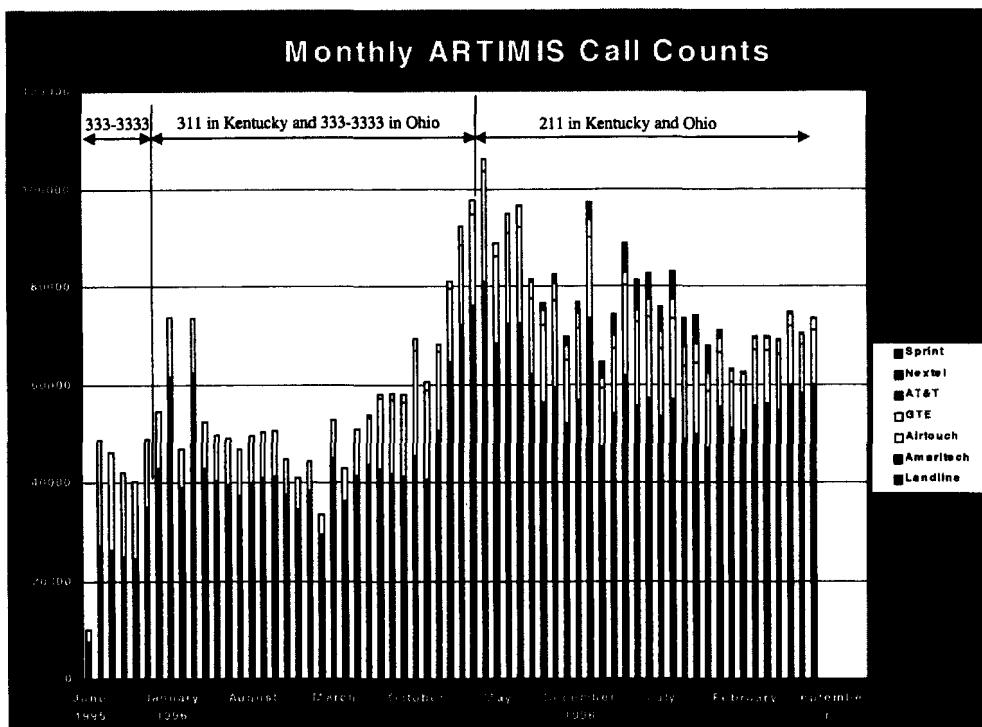
Example 3 – Subsidized basic 511+ Subscription for personalized services.

The 511 service operator offers a personalized service option for a monthly fee. Subscribers can receive personalized information services that tailor the “broadcast” information available in the

¹¹ The term “Up-Selling” refers to the offering of a basic service (either free or fee based), and within that service offering still *another* service that requires the payment of an additional fee. This could be either a one-time charge or a subscription offering. An example of an “up-sell” is calling a Directory Assistance number and then being offered to “connect your call for an additional 35¢.” The price of the first call does not matter; the “up-sell” is the additional revenue potential to the provider.

- *Cincinnati/Northern Kentucky*. With a population of nearly 2 million²¹, calls to the traveler information service ARTIMIS (formerly SmarTraveler) averaged 800,000 to 1,000,000 annually. Launched in 1995, the service averaged 40,000 calls per month while using a highly memorable 7-digit number, 333-3333 and a three-digit (311) number for wireless callers. As we can see from **Figure 3: Monthly ARTIMIS Call Counts**, once a three-digit (311) number was instituted in Kentucky, call volume rose through 50-60,000 calls per month. Once both Ohio and Kentucky Public Utilities Commission and Public Service Commissions approving a three-digit (211²²) number, call counts surged to over 70,000 to 80,000 calls per month, peaking at over 100,000 calls in April of 1998. Currently, call counts continue to average between 60-80,000 calls per month.

Figure 3: Monthly ARTIMIS Call Counts



- *Directory Assistance- 411*. We might also use 411 services as a model for possible call volume when using three-digit dialing codes for information services. Though other services are now available, most telephone users understand 411 as the number to dial for Directory Assistance. Over the past decade, 411 has become a revenue generator for both landline and wireless carriers. A recent report published by the Kelsey Group noted that approximately 6 billion calls were made to 411-Directory Assistance in 2000, with projections of over 8 billion calls annually by 2003 and over 10 billion by 2005. In **Table 1. U.S. Directory Assistance Call Volumes 2000 – 2005**, we can see the projected growth in 411 call volume based on data from 2000, projected to 2005.

²¹ Includes Hamilton County Ohio, Boone County Kentucky and portions of Dearborn County Indiana.

²² The number change from 311 to 211 was necessitated by a 1997 FCC designation of 311 for non-emergency police services.

VI. Cost Elements and Issues

Cost considerations are based on which items are required to advance an existing or planned ATIS deployment to support 511. The cost to furnish 511 services need to take into account the operating and performance recommendations that will be defined elsewhere in the 511 Working Group. (e.g. content and consistency recommendations with regard to menu structure or functionality).

Figure 1: Potential 511 Cost Elements on page 11 illustrates the principal cost elements for providing a 511 service. There are two general types of charges:

- **System charges (capital expenses)** associated with establishing a 511 service and making it available for callers. These costs are largely one-time set-up costs, or monthly/annual costs such as telephone line charges or system operation and maintenance, associated with set-up and day-to-day operations. Some of these charges may be based on regular or predicted call volume (number of phone lines, etc.).
- **Calling charges** associated with completing a call to a 511 service. These costs are highly dependent upon call volume as well as the type of telephone interface deployed and system requirements (such as call forwarding or overflow capabilities). Many of these charges are based on a per-call basis.

However, for those that must pay for roaming, charges are substantial (for example, AT&T Wireless current published roaming rate is \$0.60/minute).

Overall, two major conclusions can be drawn from a discussion of calling charges and costs:

- *The per-call charge/cost range can vary widely between deployments.* Assuming average call duration ranging from 2 to 5 minutes, the possible cost range for calling charges to the 511 service provider or implementer range from \$0.00 to nearly \$0.50 per call. Additionally, per-call or per minute costs may apply to landline users (depending on their telephone service contract) as well as wireless users (in the form of airtime and perhaps roaming charges)
- *Call volume is a principal determinant in overall costs to the implementer.* This is especially true when using a toll-free backbone, as these charges are on a per-call and often per-minute basis, the total costs impact is directly proportional to the call volume. It must be understood that the more callers there are to a system using a toll-free scenario, the higher the costs. Scenarios are available to limit these costs, such as using a local number as the "translate to" number, combining the use of a local *and* toll-free number, or by encouraging the use of wireless phones that do not charge toll or long distance charges to connect to the 511 system.

There are a number of methods to reduce or limit the charges associated with a 511 call, as well as the cost of the call to the user.

Some of these methods include:

- 511 landline calls may have their own tariff at the same level as the cost of a local call to the customer.
- Translation fees for 511 calls might be "one time" charges by the telephone companies to program switches to recognize the 511 dialing code.
- 511 landline calls, if they were to be toll or long distance calls, could be billed at a reduced or flat rate (per call instead of per minute). (Though this goes against the 511 Policy Committee recommendation, it is something that an implementer might wish to explore none the less).
- 511 landline calls could ride on a toll-free backbone. Implementers would negotiate with carriers for the best rates, and may also look to have the calls billed on a per-call instead of a per minute basis.
- If the 511 service is performing "call forwarding" (call transfer) to other agencies such as transit providers or live operators, implementers and ISPs might look to minimize or flat rate these charges by using dedicated service circuits (T-1 or other) in order to maintain continuous connections. This would eliminate per call and per minute charges for these connections.
- Implementers should make every effort to bring the wireless carriers into the fold, and take advantage of wireless coverage to level or minimize costs. Using the "non-charges" of "no toll" and "no long distance" market coverage of the wireless industry can substantially limit these distance-based costs, for both the agencies and the users. In most cases, wireless carriers can translate the 511 code to a 7 or 10 digit number allowing them

for 511, and the number of staff (live operators or announcers) that must be accommodated and therefore the physical space required for an operations center.

System Operations. Costs to operate the system include the live operators or staff used to create messages, switch programming for 511 call routing, incoming phone lines (these physical lines have a fixed monthly fee per line, generally around \$30/line, independent of usage levels), and marketing costs¹². Operations costs can vary widely, with several operating and performance requirements having an impact on the cost, including:

- The acceptable number of calls that go unanswered or busy (impacts the number of phone lines required)
- The average length a caller is expected to stay on the line (impacts the number of phone lines required)
- The availability of an Interactive Voice Response (IVR) system¹³
- Reactivity of the 511 service for short duration events such as incidents, concerts and sporting events (impacts staffing/interface requirements and call volumes)
- Degree of localization of the service provided (impacts staffing/interface requirements, average call duration and call volume)
- Marketing and advertising of the 511 service (impacts call volumes and system operations costs)

What is not considered in this cost analysis is the cost for collecting the data that ultimately is processed into content. This cost is considered a sunk cost from the perspective of migration of an existing ATIS to 511 delivery.

However, it is important to recognize that packaging the information for delivery through 511 will have some unique cost centers onto itself. For example, information that may already be available on a web site must be properly formatted and converted into voice-based information for communicating via a 511 ATIS. This is normally accomplished by parsing data directly from the database that comprises the web site information; this task may be performed by the same provider (ISP) or technology that provides the web service.

System Maintenance and Monitoring. The costs associated with maintaining the telephone/IVR service (audio-text nodes), depending upon system size, can vary from low activity maintenance contract of \$10,000 annually, to \$80-100,000 or more annually for dedicated staff to support, monitor and ensure system availability.

¹² This assumes that the system will handle incoming calls only. Should the system be required to provide “call transfers” to another provider (**call transfer:** A switching system service feature that allows the calling or called user to instruct the local switching equipment or switch attendant to transfer an existing call to another terminal.), additional telephone charges would apply. These charges could be flat rate for constant connections (similar to an inside call transfer), or per call depending on predicted volume. These charges may also include toll or long distance fees depending on the destination of the call.

¹³ Should the implementers require live operators to handle specific customer service calls, this may also impact staffing.

These charges can apply to calls originated from both wireless and wireline telephones. Wireless carriers are also able to establish their own routing systems that may bypass landline translations. In other words, a wireless caller dialing 511 may be routed to a local landline number *without* the call having to be translated by the landline carrier. *Done properly, this can save significant landline and even toll-free charges.*

Please see Appendix A through E for illustrations on how 511 calls are translated using different communications methodology¹⁶.

Toll/Long Distance/Toll Free charges –(May be a cost to the user or a charge to the implementer). If a caller dials 511 and is routed to a service that is outside his or her local calling area, a common occurrence in statewide or large metropolitan area systems, then toll or long distance charges will apply. These charges can be incurred either as toll or long distance charges to the caller or, when using a toll-free number backbone, as toll-free charges to the 511 service provider.

Toll and long distance charges can vary widely based on calling plans, with the typical charge being in the range of \$0.05 to \$0.25 per minute. Toll-free charges will vary based on the region of the country, the expected call volume and the type of contract (some service operators leverage a state contract to secure very low rates), with a range of \$0.03 to \$0.08 cents per minute common. With average call duration ranging from 2 to 5 minutes, this means any average per call cost range of \$0.06 to \$0.40 per call for toll-free charges.¹⁷

Toll-free charges can apply to calls originated from both wireless and wireline telephones if they come across the toll-free backbone. In the case of a wireless caller, both the 511 implementer *and* the user incur charges. The implementer through toll-free service charges, and the caller through airtime charges. Depending on the market, some charges can be mitigated both to the caller and the service provider when using a wireless phone. The San Francisco Bay area is a good example of a region where a call from one side of the Bay to the other incurs a toll charge to a landline caller, thus inviting the use of a toll-free number. Yet wireless calls do not incur toll charges anywhere in the Bay area.

Tariff Rates for carriage – (Generally a charge to the implementer, however user costs may apply in some areas). In certain areas of the country a tariff might exist that either applies to or is directed at a 511 service. In these cases, the costs of translating the calls and re-directing them to a 7 or 10-digit number have already been decided. Additionally, carriers will often assess “programming charges” associated with the cost of software programming in each of their central offices.

¹⁶ Additionally, USDOT has prepared a paper called “Call Routing and its Implications for 511” which provides an overview of call routing, legislative and regulatory issues, and intellectual property and patent issues. The document can be accessed at http://www.its.dot.gov/511/Call_Routing.pdf

¹⁷ Implementers may be able to negotiate “per call” rates instead of “per minute” rates from the toll-free providers. These negotiations would likely require a “guaranteed” number of calls to the 511 service per month.

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- Marketing and advertising of the 511 service (impacts call volumes and system operations costs)

What is not considered in this cost analysis is the cost for collecting the data that ultimately is processed into content. This cost is considered a sunk cost from the perspective of migration of an existing ATIS to 511 delivery.

However, it is important to recognize that packaging the information for delivery through 511 will have some unique cost centers onto itself. For example, information that may already be available on a web site must be properly formatted and converted into voice-based information for communicating via a 511 ATIS. This is normally accomplished by parsing data directly from the database that comprises the web site information; this task may be performed by the same provider (ISP) or technology that provides the web service.

System Maintenance and Monitoring. The costs associated with maintaining the telephone/IVR service (audio-text nodes), depending upon system size, can vary from low activity maintenance contract of \$10,000 annually, to \$80-100,000 or more annually for dedicated staff to support, monitor and ensure system availability.

¹² This assumes that the system will handle incoming calls only. Should the system be required to provide "call transfers" to another provider (**call transfer:** A switching system service feature that allows the calling or called user to instruct the local switching equipment or switch attendant to transfer an existing call to another terminal.), additional telephone charges would apply. These charges could be flat rate for constant connections (similar to an inside call transfer), or per call depending on predicted volume. These charges may also include toll or long distance fees depending on the destination of the call.

¹³ Should the implementers require live operators to handle specific customer service calls, this may also impact staffing.

However, for those that must pay for roaming, charges are substantial (for example, AT&T Wireless current published roaming rate is \$0.60/minute).

Overall, two major conclusions can be drawn from a discussion of calling charges and costs:

- *The per-call charge/cost range can vary widely between deployments.* Assuming average call duration ranging from 2 to 5 minutes, the possible cost range for calling charges to the 511 service provider or implementer range from \$0.00 to nearly \$0.50 per call. Additionally, per-call or per minute costs may apply to landline users (depending on their telephone service contract) as well as wireless users (in the form of airtime and perhaps roaming charges)
- *Call volume is a principal determinant in overall costs to the implementer.* This is especially true when using a toll-free backbone, as these charges are on a per-call and often per-minute basis, the total costs impact is directly proportional to the call volume. It must be understood that the more callers there are to a system using a toll-free scenario, the higher the costs. Scenarios are available to limit these costs, such as using a local number as the “translate to” number, combining the use of a local *and* toll-free number, or by encouraging the use of wireless phones that do not charge toll or long distance charges to connect to the 511 system.

There are a number of methods to reduce or limit the charges associated with a 511 call, as well as the cost of the call to the user.

Some of these methods include:

- 511 landline calls may have their own tariff at the same level as the cost of a local call to the customer.
- Translation fees for 511 calls might be “one time” charges by the telephone companies to program switches to recognize the 511 dialing code.
- 511 landline calls, if they were to be toll or long distance calls, could be billed at a reduced or flat rate (per call instead of per minute). (Though this goes against the 511 Policy Committee recommendation, it is something that an implementer might wish to explore none the less).
- 511 landline calls could ride on a toll-free backbone. Implementers would negotiate with carriers for the best rates, and may also look to have the calls billed on a per-call instead of a per minute basis.
- If the 511 service is performing “call forwarding” (call transfer) to other agencies such as transit providers or live operators, implementers and ISPs might look to minimize or flat rate these charges by using dedicated service circuits (T-1 or other) in order to maintain continuous connections. This would eliminate per call and per minute charges for these connections.
- Implementers should make every effort to bring the wireless carriers into the fold, and take advantage of wireless coverage to level or minimize costs. Using the “non-charges” of “no toll” and “no long distance” market coverage of the wireless industry can substantially limit these distance-based costs, for both the agencies and the users. In most cases, wireless carriers can translate the 511 code to a 7 or 10 digit number allowing them

VI. Cost Elements and Issues

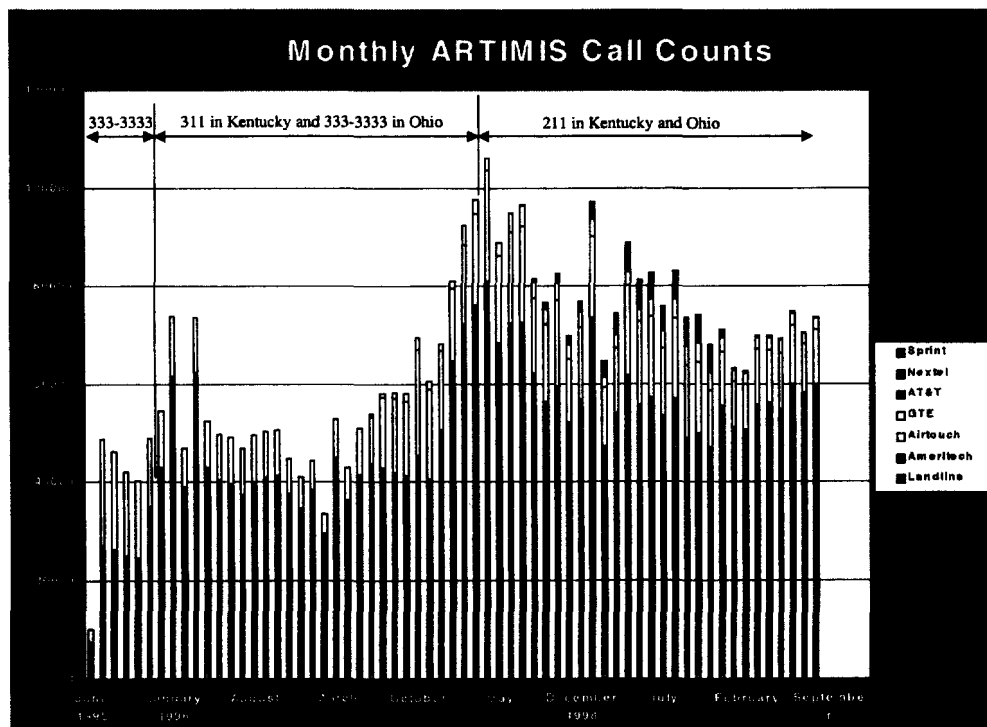
Cost considerations are based on which items are required to advance an existing or planned ATIS deployment to support 511. The cost to furnish 511 services need to take into account the operating and performance recommendations that will be defined elsewhere in the 511 Working Group. (e.g. content and consistency recommendations with regard to menu structure or functionality).

Figure 1: **Potential 511 Cost Elements** on page 11 illustrates the principal cost elements for providing a 511 service. There are two general types of charges:

- **System charges (capital expenses)** associated with establishing a 511 service and making it available for callers. These costs are largely one-time set-up costs, or monthly/annual costs such as telephone line charges or system operation and maintenance, associated with set-up and day-to-day operations. Some of these charges may be based on regular or predicted call volume (number of phone lines, etc.).
- **Calling charges** associated with completing a call to a 511 service. These costs are highly dependent upon call volume as well as the type of telephone interface deployed and system requirements (such as call forwarding or overflow capabilities). Many of these charges are based on a per-call basis.

- *Cincinnati/Northern Kentucky*. With a population of nearly 2 million²¹, calls to the traveler information service ARTIMIS (formerly SmarTraveler) averaged 800,000 to 1,000,000 annually. Launched in 1995, the service averaged 40,000 calls per month while using a highly memorable 7-digit number, 333-3333 *and* a three-digit (311) number for wireless callers. As we can see from **Figure 3: Monthly ARTIMIS Call Counts**, once a three-digit (311) number was instituted in Kentucky, call volume rose through 50-60,000 calls per month. Once both Ohio and Kentucky Public Utilities Commission and Public Service Commissions approving a three-digit (211²²) number, call counts surged to over 70,000 to 80,000 calls per month, peaking at over 100,000 calls in April of 1998. Currently, call counts continue to average between 60-80,000 calls per month.

Figure 3: Monthly ARTIMIS Call Counts



- *Directory Assistance- 411*. We might also use 411 services as a model for possible call volume when using three-digit dialing codes for information services. Though other services are now available, most telephone users understand 411 as the number to dial for Directory Assistance. Over the past decade, 411 has become a revenue generator for both landline and wireless carriers. A recent report published by the Kelsey Group noted that approximately 6 billion calls were made to 411-Directory Assistance in 2000, with projections of over 8 billion calls annually by 2003 and over 10 billion by 2005. In **Table 1. U.S. Directory Assistance Call Volumes 2000 – 2005**, we can see the projected growth in 411 call volume based on data from 2000, projected to 2005.

²¹ Includes Hamilton County Ohio, Boone County Kentucky and portions of Dearborn County Indiana.

²² The number change from 311 to 211 was necessitated by a 1997 FCC designation of 311 for non-emergency police services.

V. Hybrid Business Models

If innovative models are used to support 511 services, it is likely they will occur in a hybrid fashion. It should be noted that a government subsidy will very likely be needed for the Basic level of 511 service. Unless a change is made to the Policy Committee decision on the price being no more than the cost of a local call to the user, funding is required to sustain day-to-day basic operations until such time as private revenue can grow and *perhaps* be used to defray the public sector funding.

The following are examples of hybrid models, which may be applicable in certain areas to help offset costs to implement a 511 service. In any of these and other examples, telecommunications carriers may hold an unspecified part of the process. If the network operator sees a light at the end of the tunnel (such as billing or consuming more wireless minutes, offering advertising, or up-selling to a premium service), then they may offer to subsidize a portion of the service. This has been successful mostly in markets where the carriers could see the benefit of “partnering” with a government agency.

Example 1 – Subsidized basic 511 services + Sponsorship or Advertising.

Basic content is provided for free to the traveling public with the expense of the service being funded by public agencies in the service area. Short sponsorship messages and advertising may partially defray the subsidy by feeding revenue back into day-to-day operations or system upgrades and maintenance.

Example 2 – Subsidized basic 511 + Per-use premium services (Up-Selling¹¹).

A private 511 service operator is funded by public agencies, underwriting basic service delivery. The service provider offers callers the option of premium services that generate revenue by charging the caller and/or by obtaining a commission for services provided to a caller by another service provider (e.g. reserving a cab). Revenue from the premium services may be shared between the service provider and the public agencies on a negotiated basis, to further defray public agency subsidy of the basic services.

Example 3 – Subsidized basic 511+ Subscription for personalized services.

The 511 service operator offers a personalized service option for a monthly fee. Subscribers can receive personalized information services that tailor the “broadcast” information available in the

¹¹ The term “Up-Selling” refers to the offering of a basic service (either free or fee based), and within that service offering still *another* service that requires the payment of an additional fee. This could be either a one-time charge or a subscription offering. An example of an “up-sell” is calling a Directory Assistance number and then being offered to “connect your call for an additional 35¢.” The price of the first call does not matter; the “up-sell” is the additional revenue potential to the provider.

two separate abbreviated dialing codes for wireless callers). It was not until the summer of 1995 that both wireless carriers began using a uniform access code (*1), allowing for a more uniform marketing approach. It was at this point that call counts began to rise from an average of 100,000-130,000 per month to 200,000-350,000 calls per month, with the majority of the calls coming from wireless callers.

As **Figure 3: Monthly ARTIMIS Call Counts** indicates, prior to 311/211 service, access to ARTIMIS TATS was about 50% landline and 50% wireless. Roughly 1 million calls are received annually, with over 4 million total since ARTIMIS TATS began operation. Since 311 was introduced, the ratio of calls has moved to 60% landline and 40% cellular. This landline penetration stands in sharp contrast to similar systems in the country. Other systems tend to have free cellular access but do not have a three-digit landline access number, and generally have less than 50% of calls via landline. This even though the wireless providers in Cincinnati offer *free* access to ARTIMIS through their networks. Having a uniform, easy to remember dialing code across all platforms may be one reason that more callers are using landline phones.

Cost Elements “Rules of Thumb”

The Cost Issues paper (dated 03/16/01) that was drafted for the 511 Policy Committee Retreat in Tampa Bay, FL at the end of March 2001 cited some general “rules of thumb” for costs encountered in 511 service provision. *Note that some of these costs may include overall costs to operate a traffic management and information facility as well:*

- *Highly automated, limited or no human involvement in operation:* These are the least costly systems to establish and to operate. In Arizona, such a system was created for roughly \$100,000. Maintenance costs are minimal, roughly \$10,000 annually.
- *Automated system, with human recorded information:* These systems are typical of the metropolitan traffic/multi-modal services. To establish such a service could cost \$500,000 to \$1 million. A rule of thumb for system operations would be \$1 million annually, with that figure varying due to many factors including size of region, hours of operations, etc.
- *Human operator-based system:* Typical of transit information services, these systems are the most costly, as many full time staff could be required to provide the service. Many services are paying in the millions to create a trip itinerary planning system that operators can use to more quickly and accurately respond to caller inquiries. An annual operating budget for a large transit information center can exceed \$4 million.
- *Telecommunications costs:* A good rule of thumb is \$0.25 per call, though of course it varies based on implementation, mix of calls, etc. However, the cost of any physical telephone lines is not included in these costs.

Putting this all together, in the instance of a large metropolitan area, this may represent 60,000 to 100,000 calls per day. **In rough numbers this could translate into \$500,000 to \$1 million to install the system; \$1,000,000 annually to operate; and \$6,500,000 annually to cover the communications costs for a 250 business day cycle.** Again this does not include the cost of fabricating or packaging the data, nor does it include the routing and switching costs. These

some action to cancel the subscription. (Magazine publishers and credit card companies often use this method to lure new customers. A customer agrees to a “sample” of the service, but must take direct action informing the provider that you wish to cancel the subscription before being charged for it.)

Pay-Per-Call Model

(This model conflicts with the 511 Policy Committee decision of making a 511 call “no more than the cost of a local call to the user.”)

The per-call model charges the end user for the service on a call-by-call basis. This allows the Service Provider to charge for the specific cost of the call and then bill the end user through their existing phone service. As an example, Verizon in Massachusetts charges \$0.35 each time an end user accesses Directory Assistance.

Advertising and Sponsorship Model

Under this model, advertisers and sponsors would have the ability to place ads throughout the service, covering the costs of the service itself. Services that have the potential to drive sufficient call volume will be able to command a higher price for ad placements. As an example on the Internet, information based services such as Yahoo’s website generate 90% of their revenue from selling ads onto their service. However the prices that these high-traffic web sites were able to command in the late 1990’s have themselves been reduced in the last year.

It needs to be recognized that models based on using non-traditional media – those other than radio, print, and television – often are very difficult to sustain, and have significant costs associated with the sales cycle or may require at least regional to national coverage before reasonable revenue projections can be met. For example: Wal-Mart is approached to purchase advertising on or to sponsor a 511 service. In order for Wal-Mart to “get their monies worth,” the service would need to guarantee a minimum number of callers *and* cover a geographic area larger than one metropolitan area. Otherwise, the advertising department would more than likely spend their money buying radio or television advertising time instead, as many radio stations and some TV stations cover more than one market by virtue of their broadcast power, and carriage on cable and satellite services⁸.

Finally, the service provider would need (and be willing to pay) a sales force to sell these advertisements. True, salespeople are traditionally paid from commissions on sales they make, but there would need to be enough revenue from the advertising to support this staff on a continuing basis.

Loss-Leader or Franchise Model

Under this model, the 511 service provider (ISP) would underwrite all or a portion of delivering the service in exchange for the opportunity to market and up-sell the caller additional services

⁸ WCBS in New York can be heard from Rhode Island to Pennsylvania, while WBZ (1030 AM) in Boston can be heard across 40 states in the evening hours, as can WLW (700 AM) in Cincinnati. Their advertising rates can include these “long reach” capabilities.

responsible for funding this toll-free number with no return of revenue... and that the more successful the service becomes, the more likely the costs will rise as call volumes increase.

This scenario holds true whether a 511 number is used through a toll-free backbone or whether a toll-free number is used directly. The benefit of a 511 number is that it is more memorable and will likely generate higher usage from the outset, especially when it is associated with a national standard service.

Case two: A local call to the user

The cost of the 511 call is borne by the caller, but on a limited basis. This is the scenario that has been in place in previous years in the San Francisco Bay area. The Metropolitan Transportation Commission, in their original deployment of TravInfo, placed audio text nodes in all of the disparate area codes surrounding San Francisco Bay. This meant that callers to TravInfo would only be charged the cost of a local call no matter what area code they were calling from. Since many (if not most) telephone users in the area have "metropolitan dialing service," where local calls are included in their monthly service charges, callers did not see separate charges for these calls and *presumed* them to be free. When the area codes around the Bay split, MTC placed Remote Call Forwarding²⁷ circuits in these new area codes to forward calls to existing area codes' hardware nodes for answering. In this case, MTC was responsible for paying the cost of the forwarded call. This can become costly and complicated as it might take a significant number of nodes and circuits to allow a service to cover a large metropolitan area with everyone having access to a local calling circuit.

There are a number of scenarios where some of these charges might be reduced such as; flat rate connections between the area codes (T-1 circuits, etc.); Foreign Exchange and remote call forwarding circuits at negotiated rates; deploying local numbers where possible and using negotiated rate toll-free numbers only where absolutely necessary to reduce overall costs. Regardless of the choice, the decision must be seamless to the caller.

Using a 511 number creates an assumption of limited or explained cost. One need only look at the 411-information industry to see where charges may differ from market to market, but are *expected* by callers using the service.

Case three: Call paid by the user whether local, toll or long distance

The third case uses a number that is a local 7 or 10 digit number, or assigns such a value to a 511 number. One might assume that a service that is highly valued by the users would be "worth the cost of a call" to a regularly dialed number. In the case of SmarTraveler in Boston, the service has been available as a standard 7 or 10 digit number since it's inception, and thus a toll call to users outside of the local dialing area to Cambridge, MA. This has not decreased the number of users to a known degree. Though roughly 85-90% of the service's 350,000+ calls per month are from wireless phones, 35,000-52,000 calls per month to the service are via landlines. It is

²⁷ **Remote call forwarding:** A service feature that allows calls coming to a remote call-forwarding number to be automatically forwarded to any answering location designated by the call receiver. *Note:* Customers may have a remote-forwarding telephone number in a central switching office without having any other local telephone service in that office.

These costs could include:

- 511 Translation Fees⁵ - assessed to the implementer;
- 511 tariff (per-call or per minute charges which may include translation fees) charged to the implementer;
- Landline costs (to the user) be they local or toll;
- Toll-free charges (to the implementer) if the 511 call rides a toll-free backbone;
- Call-transfer charges (to the implementer) if calls are routed to other agencies;

Though many implementers are concerned about the safety and legal issues surrounding wireless callers⁶, this should not be viewed as a deterrent to encouraging wireless carriers to take part in the 511 program. In fact, it might be seen as an entrée into a new level of service if callers understand that using a cellular phone to access 511 *before* they travel, (either from their home or office), might be “cheaper” and easier for them than using a landline phone. This is especially true for transit riders, who may be seeking information as they walk to their station, or find themselves waiting on the platform in need of updated information.

⁵ A “translation” occurs when a call is placed to one number, and is then routed to another number. In the instance of 511, a user would dial 511 from their telephone, and the call would be ‘translated’ to a 7 or 10-digit local or toll-free number where it will be terminated.

⁶ In June of this year, the New York state assembly passed a bill banning the use of a handheld cellular phone while driving.

VII. The Business Models and ATIS: How they have fared so far?

When looking at the potential business models, one might ask if these models have been tried before, and how they have fared?

The following is an assessment of how these potential business models have been applied to ATIS to date and a qualitative evaluation of their effectiveness. Recognize that the past is not necessarily a barometer of future conditions, as even current ATIS contracts are undergoing changes in revenue and cost recovery expectations. In many places, it has been difficult for agencies to obtain funds to support ATIS.

Detailed Case Studies for metropolitan areas already using an ATIS model (prior to, and in preparation for 511) are available at <http://www.its.dot.gov/511/511.htm> under the “Lessons Learned” heading.

Subscription Model

Personalized traffic information subscriptions have been tried on a limited basis. These services have yet to achieve much success. The barrier for success appears to be that the information provided has been unable to pass the litmus test of “is it that much better than radio reports that I would pay extra for the service.” As an example, Trafficstation, a private company that operated a stand-alone web site that offered general (non-subscribed) users access to information by clicking through maps manually, *and* an up-sell subscriber model (with subsidized operations through some government contracts) that offered subscribers pro-active notification through e-mail, pagers and telephone calls, has recently undergone a financial shakedown leading to a halt in day-to-day operations.

Pay-Per-Call Model

Per use charges for traveler information have limited if any history in the North America. One case of a cellular call-in number in the Seattle area was promising but ran out of funds before it could establish itself. The Boston SmarTraveler service ran a “900” number service in 1991-92, prior to entering into a government contract with MassHighway. Even with a tie-in to local radio and television stations, the “take rate” was notably low.

Advertising and Sponsorship Model

This model has mixed results to date as a revenue generator for ATIS and has yet to prove it can entirely support ATIS as it does radio and broadcast television. No ATIS website in operation generates substantial advertising revenue. Mapquest.com generates significant revenues but draws the most people for its driving directions, not traffic information features. While audio portals such as TellMe and BeVocal, offer case studies that indicate it is possible to generate revenue from advertising, it has not come close yet to generating the funds needed to fully

- Cooperative agencies, such as transit, airport, ferry providers, etc.
- Private Information Service Providers (ISPs)
- Local Exchange Carriers² (LECs); Long Distance Telephone carriers; Toll-Free telephone carriers; wireless carriers (multiple in each market)
- Consumers – who ultimately decides whether the service they are using provides them information of enough value that they will call back a second time.

II. Organization

With that, this report is organized into four sections:

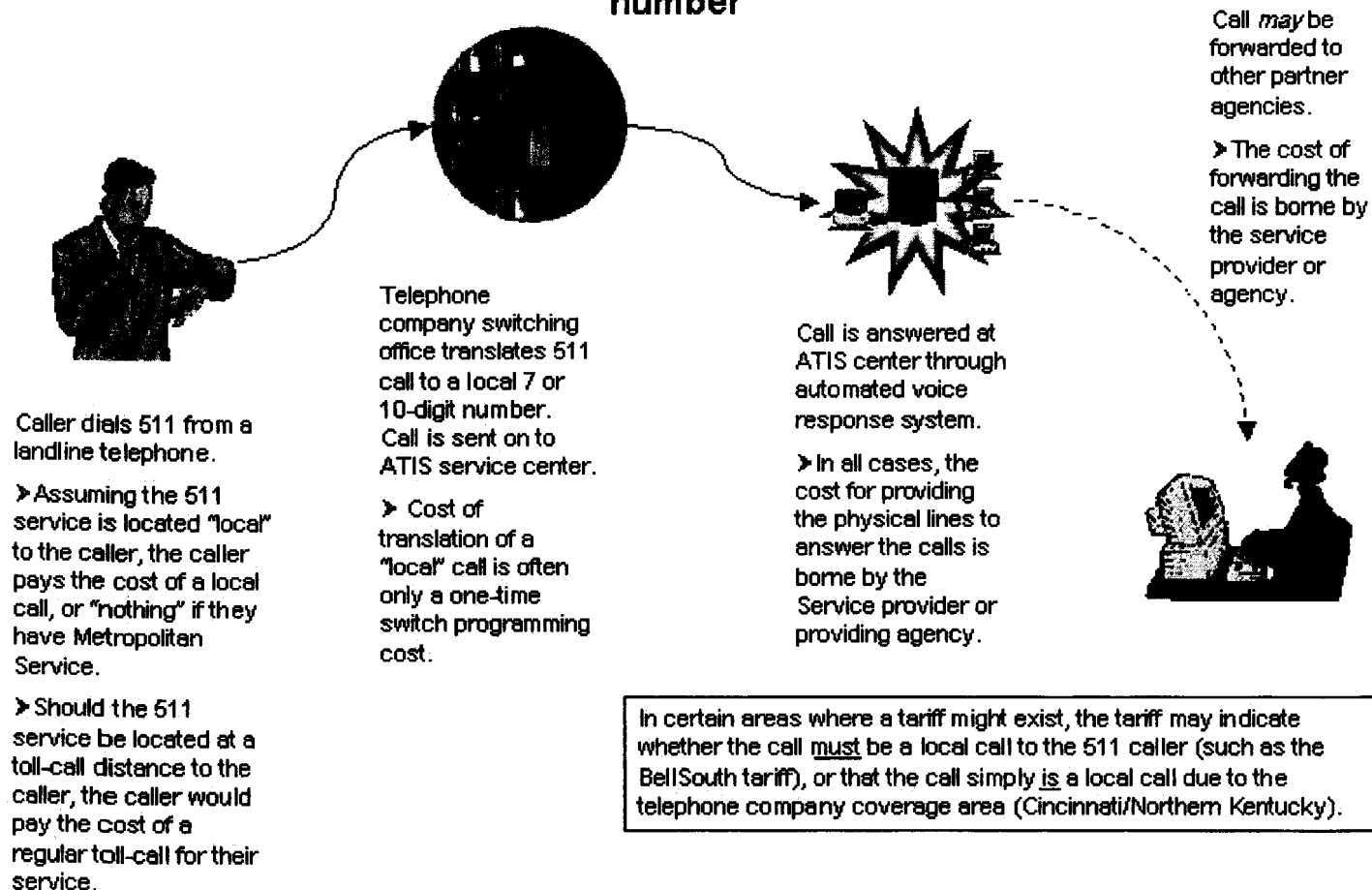
- Summary of Key Findings
- Potential Business Models
- Cost Elements and Issues
- Other Business Models – How have they fared

The Recommendations and Potential Business Models sections come at the beginning of this document in order to illustrate the potential issues that may apply in implementing a 511 code in a particular area. The elements that comprise the decision process are discussed in detail thereafter.

² **Local exchange carrier (LEC):** A local telephone company that provides ordinary local voice-grade telecommunications service under regulation within a specified service area.

Appendix A: Tracking a Local 511 Call

Tracking a 511 call using a "regular" 7 or 10-digit number

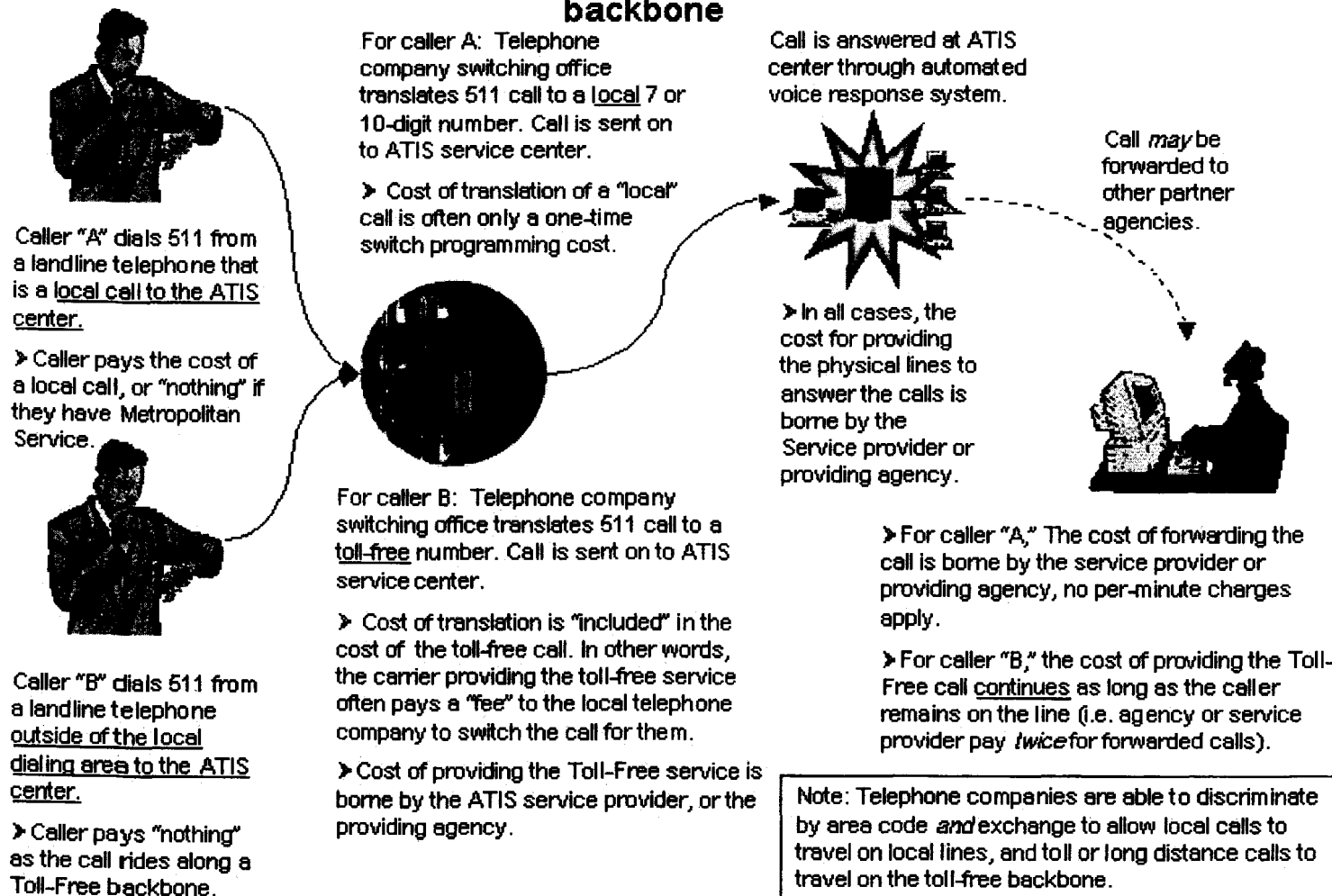


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Appendix C: Tracking a Toll-Free & Local 511 Call

Tracking a 511 call using a Local and Toll-Free backbone



511 ATIS Business Models Report

Version 1.0

August 2001